

REMARKS

The Office Action of April 19, 2005 has been reviewed and the Examiner's comments carefully considered. The present Amendment amends claims 1, 4, 9, 10, 13 and 21 in accordance with the originally-filed specification. Further, claims 3 and 7 have been cancelled. No new matter has been added. Claims 1, 2, 4-6 and 8-22 remain in this application, and claims 1, 4 and 13 are in independent form.

In the Office Action, the Examiner has rejected all of pending claims 1-22. In particular, claims 4, 6-8, 10, 13-15 and 19-22 stand rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 5,167,352 to Robbins. Further, claims 1-3, 9 and 17 stand rejected under 35 U.S.C. § 103(a) as being obvious over the Robbins patent. Claims 5 and 16 stand rejected under 35 U.S.C. § 103(a) as being obvious over the Robbins patent in view of U.S. Patent No. 5,090,586 to Mitchell. Finally, claims 11, 12 and 18 stand rejected under 35 U.S.C. § 103(a) as being obvious over the Robbins patent in view of U.S. Patent No. 4,510,019 to Bartelloni. In view of the foregoing amendments and the following remarks, Applicant respectfully requests reconsideration of these rejections.

Independent claim 1 of the present application, as amended, is directed to an underground reservoir for storing liquid products. This reservoir consists of a single-component inner, main reservoir and an outer, secondary reservoir consisting of a coating layer. The coating layer consists of an inner layer made from an impervious material and an outer layer made of solventless, structural polyurethane. In addition, a gap for receiving a sensor is defined between the inner reservoir and the outer reservoir.

Independent claim 4 of the present application, as amended, is directed to a process for manufacturing an underground reservoir. This process consists of the steps of:

providing a single-component inner, main reservoir, and covering an outer surface of the main reservoir with a first coating layer consisting of an impervious material, and applying a second coating layer consisting of solventless, structural polyurethane over the first coating layer, thereby forming a bonded, two-component an outer, secondary reservoir. In addition, a gap for receiving a sensor is defined between the inner reservoir and the outer reservoir.

Independent claim 13 of the present application, as amended, is directed to a process for manufacturing an underground reservoir. The process consists of the steps of: providing a single-component inner, main reservoir; covering the inner reservoir with an impervious material, in the form of a first coating layer; and spraying a polyurethane layer, in the form of a second coating layer, over the impervious material, in an airless process, thereby forming a two-component outer, secondary reservoir.

The Robbins patent is directed to a double-walled reservoir having an inner layer made of steel, an intermediate or interstitial barrier layer made from a number of porous materials and an outer layer made of plastic resin. The outer layer or tank of the Robbins patent may or may not be made with a reinforcement material.

Specifically, the Robbins patent discusses an intermediate or interstitial porous barrier layer 18c, which is composed of one-sided corrugated sheet material 74, such as one-sided corrugated cardboard. This intermediate porous barrier liner 18 may also be a foam material. In order to ensure that the open-cell foam material (layer 18) will not be dissolved by the resin of outer shell 24, a vapor barrier sheet 50 is applied over the entire intermediate porous layer 18 before application of the fiber-reinforced resin of outer shell 24. The vapor barrier layer 50, by ensuring that whatever open-cell foam is used will not dissolve in the resin of outer shell 24, also ensures that the open-cell foam will not lose any of its porosity

and fluid flow capacity. Monitor sensors 44 may be used to detect the presence of leaks in the tank 10. Element 42 in the Robbins patent is a pipe in which the monitor sensor 44 is lowered to a location proximate the bottom of the interstitial headspace 32. Any material that leaks from the tank and into the intermediate porous layer 18 will not penetrate the gap in the pipe 42, as it is constructed from a metallic or similar material. Instead, the leaked material will flow through the interstitial spaces in the barrier layer 18, and only may reach the location of the monitor sensor 44.

The Bartelloni patent is directed to latex-containing papers, and it appears that the Examiner continues to use the Bartelloni patent for its teaching of specialty paper applications. Further, the Examiner continues to use the Mitchell patent for its teaching of the common surface preparation technique of abrasive blasting of the steel.

Independent claims 1, 4 and 13 have been modified to better define the inventive subject matter of the present invention. Based upon the previously submitted arguments, the arguments presented herein and the present claim amendments, Applicant respectfully submits that the double wall tank system of the Robbins patent is wholly distinguishable from the underground reservoir and process for manufacturing such a reservoir according to the present invention. The Robbins patent does not teach an inner, main reservoir as one structure (a single component), and an outer, secondary reservoir as a two-component coating layer, which forms a structurally independent secondary reservoir. Instead, the Robbins patent focuses on the intermediate porous barrier layer 18 positioned around the inner, main layer or tank and how it can better direct any fluid leaking therefrom to the bottom part of the double-walled reservoir, between the inner and outer layers or tanks. As discussed hereinafter, each of independent claims 1, 4 and 13 of the present application

have been amended to more clearly define the underground reservoir and process for manufacturing this reservoir, and establish the fundamental differences between the presently-invented reservoir and process for manufacturing this reservoir, when compared to the teachings and disclosure of the Robbins patent and the other prior art of record.

Independent Claim 1

The Present Invention as Claimed in Claim 1

Independent claim 1 of the present application includes two distinct reservoirs, namely an inner, main reservoir and an outer, secondary reservoir. The inner, main reservoir is a single-component tank made from a single material, such as carbon steel (see dependent claim 9). Further, the secondary reservoir includes two, and only two, layers, namely an inner layer made from an impervious material and an outer layer made from solventless, structural polyurethane. In addition, and importantly, these two tanks are separated by a gap for receiving a sensor, which is defined between the inner reservoir and the outer reservoir.

The Robbins Patent does not Teach or Suggest a Single-component Inner Reservoir and a Two-component outer Reservoir

On page 7 of the Office Action, the Examiner notes that “the inner, main reservoir is not limited in the claims to only one layer or one specific composition.” On this basis, the Examiner maintains that the inner, main reservoir is made of carbon steel and foam material. Again, in order to clarify the novel aspects of the present invention, independent claim 1 has been modified to specifically recite that the underground reservoir consists of a single-component inner, main reservoir and an outer, secondary reservoir that consists of a coating layer, which consists of an inner layer made from an impervious material and an

outer layer made from polyurethane. The use of the phrase “consists of” or “consisting of” serves to indicate that the inner, main reservoir is manufactured from a single component only, and that the secondary reservoir is manufactured from two components only (the impervious material and the polyurethane). Therefore, the claim amendments address the Examiner’s concerns regarding how the inner, main reservoir of the present invention is defined and claimed. Clearly, the Robbins patent does not teach or suggest the use of a single-component inner, main reservoir and a two-component outer, secondary reservoir separated by an interstitial gap for receiving a sensor.

*The Robbins Patent does not Teach or Suggest
a Gap Between the Inner Reservoir and the Outer Reservoir*

With respect to the gap, the Examiner believes that the structure of the Robbins patent includes such a gap, and refers specifically to reference number 42 in Fig. 2 of the Robbins patent. Reference number 42 is directed to the pipe in which the monitor 44 is positioned. The provision of such a tube, in the form of a pipe 42 for housing the monitor 44, is an industry standard, and is not an interstitial space or void for leak detection. The pipe in the Robbins patent is not part of the overall leak detection system. Instead, in the Robbins patent, the intermediate porous layer 18 (foam) is an interstitial leak detection medium, where any leaked liquids are absorbed into this layer. However, such leaks may take a large amount of time (if at all) to flow to and reach the monitor 44. In some cases, the leak may be absorbed and not necessarily transferred to the monitor 44 at all. This is obviously an undesirable condition.

With respect to the present invention, a gap is specifically defined, and this gap is the interstitial layer or void between the inner and outer reservoirs, through which

leaked liquids flow by a capillary effect to the sensor positioned within the gap. Robbins does not teach or suggest such an interstitial gap or void. Still further, the claims of the present application have now been clarified to recite that the inner, main reservoir contains only a single component, and since the pipe 42 of the Robbins patent extends through the intermediate interstitial porous layer 18 (foam), the Robbins patent also does not teach a gap for receiving a sensor defined between the inner reservoir and the outer reservoir. Therefore, the structure defined in independent claim 1 of the present application, as amended, is also distinguishable from the underground tank of the Robbins patent for these additional reasons.

*The Robbins Patent does not Teach or Suggest
an Outer Reservoir Consisting of an Impervious Material Layer and a Polyurethane Layer*

Still further, on page 14 of the Office Action, the Examiner agrees with Applicant that the present invention (as represented in Fig. 2) and the Robbins patent (as represented in, e.g., Figs. 3, 4, 9, 10 and 11) are “structurally different”. Applicant is in agreement, as Fig. 3 of the Robbins patent does not teach or suggest a single-component inner reservoir and a two-component outer reservoir, where the outer reservoir includes an impervious material and an outer layer of polyurethane. Such a structure is clearly not evidenced in Fig. 3. When adding the impervious material 50 (as is accomplished in Fig. 4 of the Robbins patent), one would arrive at a four-component system, including: (1) an inner tank shell 12; (2) an intermediate porous barrier layer 18; (3) a support lamination; and (4) an outer tank shell 26. Therefore, neither of the main embodiments, or indeed any of the embodiments of the Robbins patent, teach or suggest a single-component inner, main reservoir and a two-component outer reservoir separated by a gap therebetween.

*The Robbins Patent does not Teach or Suggest
the use of a Solventless, Structural Polyurethane*

Still further, the polyurethane of the present invention is a pure, structural polyurethane layer formed without the addition of any solvents. This polyurethane material is a two-constituent (polyol and isocyanate) reactive liquid that is formed during application in an airless process (as discussed in detail hereinafter). 100% solid and structural polyurethane made in this airless process is particularly beneficial when used in manufacturing the novel underground reservoir of the present invention. As summarily explained on www.madisonchemical.com:

100% solids refers to a lack of solvents: the thickness of a 100% solids coating remains the same –whether wet or dry – because there are no solvents to evaporate. There are many advantages to 100% solids coatings. First, these coatings are more environmentally friendly and generally safer to use due to their decreased levels of flammability and health risk. Second, on a cost-per-mil of thickness, they are very cost-effective. Finally, most 100% solids coatings have the advantage of additional thickness that helps to increase their physical properties and chemical resistance.

For example, these enhanced physical properties include impact resistance. The impact resistance qualities of the present invention arise from the type of polyurethane used, where, in the Robbins patent, while polyurethane is mentioned, it is the reinforced fiberglass layer that lends the structural and impact resistance feature to the tank. This means that multiple layers of material are required to construct the outer reservoir of the Robbins patent in order to attain this important feature. Simply, the polyurethane used in present invention and the polyurethane used in the Robbins patent are different components, formed in different processes, applied in a different manner and resulting in different physical and chemical characteristics.

Still further, in the Office Action, and with respect to the Robbins patent, the Examiner states: "Because the outer layer of resin is formed completely from polyurethane and no other additives are mentioned, the polyurethane is inherently made without the addition of solvents." However, in fact, and as discussed above, the Robbins patent is referring to an entirely different type of polyurethane, which is not solventless, structural nor a two-constituent reactive polyurethane, as is the polyurethane used in the present invention. Accordingly, for these additional reasons, the underground reservoir set forth in claim 1 is further distinguishable from the tank of the Robbins patent, as well as the remaining art of record.

None of the Robbins Patent nor Any of the Art of Record Teach or Suggest the Novel and Non-obvious Invention, as Recited in Independent Claim 1 of the Present Application

Therefore, none of the Robbins patent, the Bartelloni patent, the Mitchell patent nor any of the prior art of record, whether used alone or in combination, teaches or suggests an underground reservoir consisting of a single-component inner, main reservoir and an outer, secondary reservoir consisting of a coating layer, which consists of an inner layer made from an impervious material and an outer layer made of solventless, structural polyurethane, where a gap is defined between the inner reservoir and the outer reservoir, as specifically set forth in independent claim 1, as amended. There is no hint or suggestion in any of the references cited by the Examiner to combine these references in a manner which would render the invention, as claimed, obvious. Reconsideration of the rejection and allowance of independent claim 1 are respectfully requested.

Independent Claim 4

The Present Invention as Claimed in Claim 4

Independent claim 4 is directed to a process for manufacturing an underground reservoir. This process consists of the steps of: providing a single-component inner, main reservoir, and covering an outer surface of the main reservoir with a first coating layer consisting of an impervious material, and applying a second coating layer consisting of solventless, structural polyurethane, over the first coating layer to form a bonded, two-component outer, secondary reservoir. In addition, a gap for receiving a sensor is defined between the inner reservoir and the outer reservoir.

*The Robbins Patent does not Teach or Suggest
a Single-component Inner, Main Reservoir*

As discussed hereinabove, the Robbins patent does not teach or suggest a single-component inner, main reservoir. Specifically, as set forth above in connection with independent claim 1, it is the Examiner's position that the inner tank includes the inner tank wall or layer 16 and intermediate porous barrier layer 18, which is a foam material or similar porous, absorption material. The Robbins patent does not teach or suggest a single-component inner, main reservoir as set forth in independent claim 4.

*The Robbins Patent does not Teach or Suggest
a Method for Manufacturing a Reservoir that Excludes an Intermediate Porous Layer*

On page 4 of the Office Action, the Examiner admits that the method of the Robbins patent also includes adding foam material prior to the waxed paper coating, and further indicates that since claim 4 is presented in open language, the scope of claim 4 can include the additional step of adding a foam layer prior to applying the impervious paper layer. First, independent claim 4 has been amended to include the phrase "consisting of"

before the steps set forth therein. Therefore, the process for manufacturing defined in claim 4 consists of only the steps set forth therein, namely providing the single-component inner, main reservoir and covering an outer surface of the main reservoir with a first coating layer of impervious material and applying a second coating layer of polyurethane over the first coating layer. In addition, it is the use of the first coating layer over the main reservoir, which, when the polyurethane layer is applied, provides the gap for receiving the sensor between the inner reservoir and the outer reservoir. Accordingly, independent claim 4 now expressly does not include any additional steps, for example, the Robbins step of adding foam material prior to applying the impervious material. This is a further basis for patentability of independent claim 4 in view of the prior art of record, including the Robbins patent.

*The Robbins Patent does not Teach or Suggest
a Gap Between the Inner Reservoir and the Outer Reservoir*

Still further, and as discussed above in connection with independent claim 1, the Robbins patent does not teach an interstitial gap defined between the inner reservoir and the outer reservoir. This gap is created during the manufacturing process, and is not evidenced in Figs. 2-4, 9-11 and 29 of the Robbins patent. Instead, the Robbins patent teaches the use of an interstitial transport medium (the intermediate porous layer) for absorbing a leaked liquid. Furthermore, the inner area of the pipe 42 is not the interstitial “gap” as shown, described, claimed and contemplated in the present invention. The gap of the present invention is between the inner, main reservoir and the outer, secondary reservoir, which is a structure that is not disclosed or contemplated in the Robbins patent.

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*The Robbins Patent does not Teach or Suggest
a Solventless, Structural Polyurethane, which Bonds to the Impervious Paper Layer*

As discussed above, the polyurethane of the present invention is a pure, structural polyurethane layer formed without the addition of any solvents. In addition, this polyurethane is formed from two constituents - polyol and isocyanate - in a reactive liquid that is formed during application in an airless process. Again, the polyurethane used in present invention and the polyurethane used in the Robbins patent are different components, formed in different processes, applied in a different manner and resulting in different physical and chemical characteristics. Indeed, Robbins could not and did not envision the use of this form of polyurethane, as applied in an airless process, and which results in unique, beneficial characteristics.

In addition, during application in the airless process, the applied polyurethane is bonded to the impervious paper layer, which creates not only this impact resistant outer, secondary reservoir, but also the gap in between the reservoirs. This bonded, two-component outer, secondary reservoir is beneficially impact resistant, which is a characteristic that is highly desirable in the underground tank field. Neither the Robbins patent, nor any of the art of record, teach or suggest the application of polyurethane to an impervious material to form a bonded, two-component outer, secondary reservoir, as specifically claimed in claim 4 of the present application.

*None of the Robbins Patent nor Any of the Art of Record Teach or Suggest the Novel
and Non-obvious Invention, as Recited in Independent Claim 4 of the Present Application*

Accordingly, none of the Robbins patent nor any of the prior art of record, whether used alone or in combination, teaches a process for manufacturing an underground reservoir, or the process that consists of steps of: providing a single-component inner, main

reservoir, and covering an outer surface of the main reservoir with a first coating layer consisting of an impervious material, and applying a second coating layer consisting of solventless, structural polyurethane over the first coating layer, thereby forming a bonded, two-component outer reservoir, where a gap for directing liquid to a sensor is defined between the inner reservoir and the outer reservoir, as specifically set forth in independent claim 4, as amended.

For the foregoing reasons, independent claim 4 is not anticipated by or rendered obvious over the Robbins patent, the Bartelloni patent, the Mitchell patent or any of the prior art of record, whether used alone or in combination. There is no hint or suggestion in any of the references cited by the Examiner to combine these references in a manner which would render the invention, as claimed, obvious. Reconsideration of the rejection and allowance of independent claim 4 are respectfully requested.

Independent Claim 13

The Present Invention as Claimed in Claim 13

Independent claim 13 is directed to a process for manufacturing an underground reservoir. The process consists of the steps of: providing a single-component inner, main reservoir; covering the inner reservoir with an impervious material, in the form of a first coating layer; and spraying a polyurethane layer, in the form of a second coating layer, over the impervious material, in an airless process, thereby forming a two-component outer, secondary reservoir.

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*The Robbins Patent does not Teach or Suggest
a Single-component Inner, Main Reservoir*

As discussed hereinabove in connection with independent claims 1 and 4, the Robbins patent does not teach or suggest a single-component inner, main reservoir. Instead, the Robbins patent teaches a three- or four-component tank system, where the intermediate layer is an absorbent material. Again, the Robbins patent does not teach or suggest a single-component inner, main reservoir as set forth in independent claim 13.

*The Robbins Patent does not Teach or Suggest
a Method for Manufacturing a Reservoir that Excludes an Intermediate Porous Layer*

As discussed above in connection with independent claim 4, independent claim 13 has now been modified to more specifically recite which steps are claimed. In particular, the phrase "consisting of" has been added to independent claim 13, such that this process includes only the steps detailed therein. Accordingly, independent claim 13 specifically does not include the step of adding a foam material prior to the impervious material, as required in the process of the Robbins patent.

*The Robbins Patent does not Teach or Suggest
a Manufacturing Process Where the Polyurethane is Applied in an Airless Process*

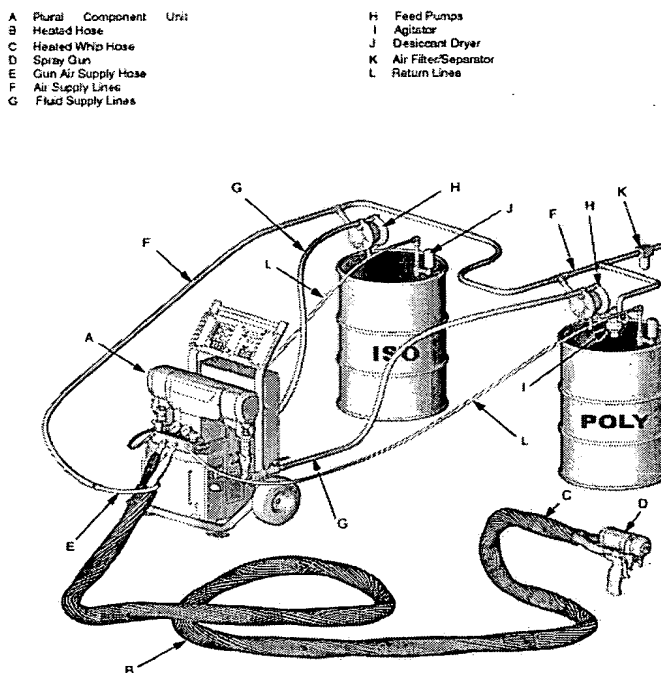
The use of the airless process for applying the polyurethane over the impervious material layer, as claimed and described in the present application, is a specified process. In particular, while not used in connection with manufacturing underground reservoirs (as claimed in the present application), the airless application of polyurethane is a relatively new and unique process, and indicates a specific process to those skilled in the art. As summarized on www.finishsystems.com:

Airless spraying is a method of spray application that does not directly use compressed air to atomize the coating material. Hydraulic pressure is used to

atomize the fluid by pumping it at high pressure (500-4,500 psi) through a small orifice (0.007-0.072 in.) spray nozzle tip located at the front of the airless gun. As the fluid is released at these high pressures, it is separated into small droplets, resulting in a finely atomized spray. The fluid is discharged at such a high velocity that it tears itself apart and sufficient momentum remains to carry the minute particles to the surface. The spray pattern size or fan angle (3-21 in.) and orifice are usually pre-selected, but different spray angles deposit the same amount of paint over a different area. A good rule is to determine the largest fan angle and the smallest orifice that is practical for your needs.

Further, when this airless application process is used in connection with polyurethane application, the following application process is typically used (as illustrated on www.graco.com):

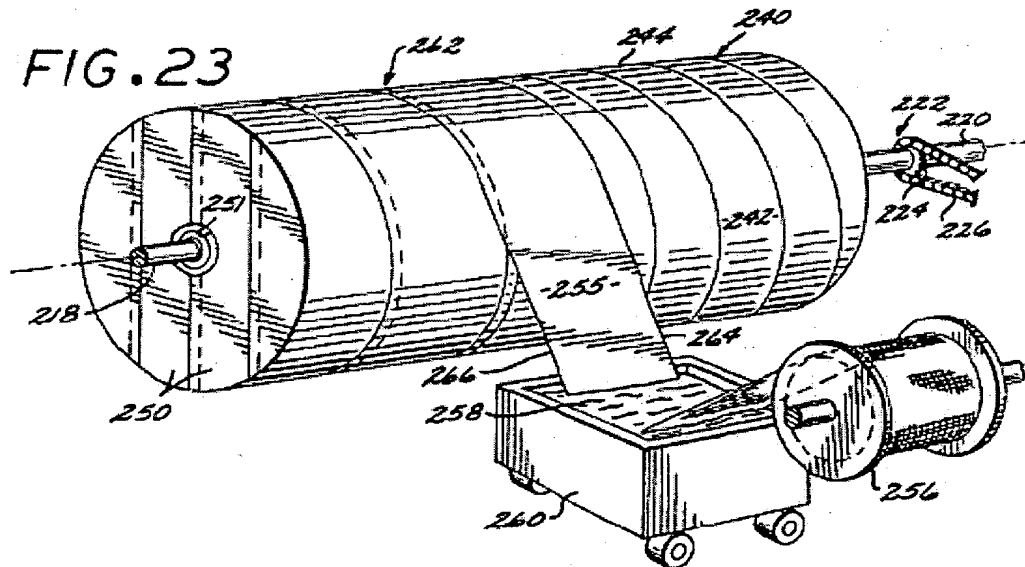
PLURAL COMPONENT APPLICATION SYSTEM



This atomization process, which is known in the art as “airless spraying” is a method of spray application that uses this airless gun. The gun is connected to the hose assembly, which is connected with the pumps. When the gun’s trigger is pressed, the two pressurized fluid

constituents (polyol and isocyanate) are released into small mixing chamber, resulting in a finely moisture and atomized spray. This mixed polyurethane fluid is discharged at such a high velocity and with sufficient momentum, that the minute particles are carried to the surface. The final product obtained is this 100% pure polyurethane, which is solventless and structural in nature.

The application process shown and described in the Robbins patent is quite different. Robbins illustrates this formation or manufacturing process in Figure 23:



In the illustrated process, a fiberglass cloth 255 is provided in an elongated sheet, and this sheet is passed through a resin bath 258 in a resin container 260. The resin-soaked fiberglass sheeting 255 is applied helically over the cylindrical body 212. This is not an airless application process, as contemplated in the present invention, and as known to those skilled in the art. The polyurethane (resin) in the process of the Robbins patent is not sprayed onto an impervious material layer in an airless process, as specifically set forth in independent claim 13 of the present application.

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None of the Robbins Patent nor Any of the Art of Record Teach or Suggest the Novel and Non-obvious Invention, as Recited in Independent Claim 13 of the Present Application

Therefore, none of the Robbins patent, nor any of the prior art of record, whether used alone or in combination, teaches a process for manufacturing an underground reservoir, where the process consists of the steps of: providing a single-component inner, main reservoir; covering the inner reservoir with impervious material, in the form of a first coating layer; and spraying a polyurethane layer, in the form of a second coating layer, over the impervious material, in an airless process, thereby forming the two-component outer, secondary reservoir, as specifically set forth in independent claim 1, as amended.

For the foregoing reasons, independent claim 13 is not anticipated by or rendered obvious over the Robbins patent, the Bartelloni patent, the Mitchell patent or any of the prior art of record, whether used alone or in combination. There is no hint or suggestion in any of the references cited by the Examiner to combine these references in a manner which would render the invention, as claimed, obvious. Reconsideration of the rejection and allowance of independent claim 13 are respectfully requested.

**All of The Independent and Dependent Claims
of the Present Application are in Allowable Form**

Claims 2, 9 and 11 depend directly or indirectly from and add further limitations to independent claim 1 and are believed to be allowable for the reasons discussed hereinabove in connection with independent claim 1. Claims 5, 6, 8, 10 and 12 depend directly or indirectly from and add further limitations to independent claim 4 and are believed to be allowable for the reasons discussed hereinabove in connection with independent claim 4. Claims 14-22 depend directly or indirectly from and add further limitations to independent

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claim 13 and are believed to be allowable for the reasons discussed hereinabove in connection with independent claim 13.

For all the foregoing reasons, Applicant believes that claims 1, 2, 4-6 and 8-22, as amended, are patentable over the prior art of record and are in condition for allowance. Reconsideration of the rejections and allowance of all pending claims 1, 2, 4-6 and 8-22 are respectfully requested.

Respectfully submitted,

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